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CHANCES OF MARRIAGE AND SEPARATION BY DEATH

In a recent issue of the BULLETIN we presented two charts showing the chances which men and women at specified ages have to survive for a given period of years and to be married within that period. But a particular interest for workers in the social welfare and insurance fields attaches also to the alternative eventuality of a person marrying within a given period and dying before the end of that period, with the result that a surviving widowed wife or husband, and perhaps orphaned children, may be left behind. We now supplement our former article with charts showing the chances of this latter event, for men and women at successive ages. These charts show, for example, that a young man, single and twenty-five years of age, has seven chances in a thousand of being married and dying within five years and thus of leaving his wife a widow and perhaps with dependent children. Extending the period from five to ten years increases the chances to two in a hundred. A period of fifteen years makes the chances five in a hundred; and within twenty years the chances of his being married and dying, so as to leave a widow, seven per cent.

Similarly, a single young woman, twenty-five years of age, has seven chances in a thousand of marrying and dying within five years, over two chances in a hundred within ten years, four within fifteen years, and over six in a hundred within twenty years.

In considering these figures, and others of the same kind which can be read from the charts, it is to be remembered that the chance of marrying and dying within a specified period of years is a *compound* probability. For a young person, the chance of marrying is relatively high and the chance of dying in a few years relatively low. At the higher ages, say, forty-five years, the chances of marriage within a given number of years, are much reduced, but the chances

of dying become greater and ultimately approach unity, that is certainty, as the period of years is increased.

On the diagram for males it will be noted that the curves for ages twenty-five, thirty-five and forty-five follow in regular succession from above downward. The curve for age fifteen appears at first sight out of place, being below all the others. This is undoubtedly due to the fact that the chances of dying are almost at a minimum at the age of fifteen, and this consideration weighs rather heavily in the resultant probability of a young boy of fifteen marrying and dying within a series of years. At the same time another consideration working in the same direction is that for the first few years, say, from fifteen to twenty, of the period thus covered, the chances of marrying also are low. In contrast with this, the curve for the forty-five-year old man is also low, but in this case, wholly on account of the low chance of marrying, the chance of dying being now considerably greater.

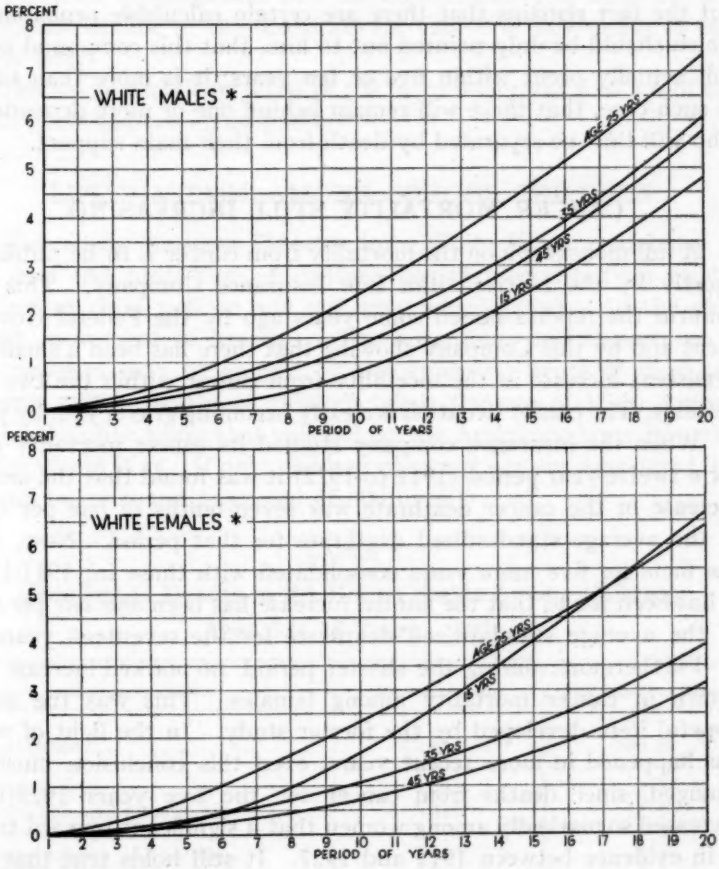
A feature of interest in the diagram for females is that certain of the curves cross* and as a result of this crossing it is found, for example, that a young girl fifteen years of age has the same chance of marrying and dying within seventeen and a half years as a young woman twenty-five years of age; and she also has the same chance of marrying and dying within five and a half years as a woman thirty-five years of age. This, of course, is due to the fact that the young girl of fifteen has a greater chance of marrying within five and a half years than an older woman of thirty-five; but, to balance this, the young girl of fifteen has a considerably smaller chance of dying within five and a half years than the woman of thirty-five. These two influences just balance, so that the two curves cross at the point corresponding to the period of five and a half years. A somewhat similar explanation can be worked out by the reader for himself regarding the crossing point of the curves for the fifteen-year old and the twenty-five-year old girl.

One general feature, which is immediately obvious in comparing the results presented in this current issue and those shown two months ago, is that all the probabilities shown on the present occasion are very much smaller than those presented in the July issue. This is simply the expression of the fact that at the ages covered by the diagram, either the chances of dying are relatively small (in the case of younger persons), or the chances of marriage are small (in the case of older persons). The compound probability of marrying

*The same effect would be observed for males if more ages were represented on the diagram. For reasons of clarity, to prevent confusion of tangled lines, only four ages have been shown.

CHANCES OF MARRIAGE AND SEPARATION BY DEATH

For single person at specified age. Probability of marriage within a specified period and of death, after marriage within that period.



* *Based on U.S. Census, 1920*

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and dying within the period specified is consequently relatively small through life, much smaller than the probability of marrying and surviving to the end of a specified period, which was the topic discussed in a previous issue of the BULLETIN.

The significance of the facts presented in the present article hardly needs to be pointed out. When a young man of twenty, say, is approached with the suggestion that he should take out insurance on his life, he may assume the attitude that he is not thinking of marrying, and still less of dying. All of which may be admitted; but the fact remains that there are certain calculable probabilities, which should be duly pointed out to him, that this compound event will actually occur within five or ten years; it is more than likely, in such case, that there will remain behind one or more dependents, who will thus be separated by death from their main support.

CANCER MORTALITY STILL INCREASING

A full monograph on the mortality from cancer is to be published shortly by the Metropolitan Life Insurance Company. This will confirm the reports issued some years ago by the Federal Government and by this Company showing that there has been a small but persistent increase in the mortality from cancer within the two last decades. The cancer situation is clearly becoming graver year by year.

When the insurance company studied its cancer mortality data for a twelve-year period (1911 to 1922) it was found that the annual increase in the cancer deathrate was seven-tenths of one per cent. of the average standardized deathrate for that period. Now, with the facts for five more years consolidated with those for 1911-1922, it has been found that the annual increase has been *over one per cent.* of the average standardized deathrate for the seventeen years.

Furthermore, during the shorter period, no marked increase was shown in cancer mortality among females. This was the single hopeful item developed by the former study. In the light of what has happened in more recent years, even this conclusion must be changed, since deaths from cancer for the five years 1923-1927 increased so markedly among women that a significant upward trend is in evidence between 1911 and 1927. It still holds true that the situation for males is much graver than for females, since the increase among the former has been three times as great as among the latter.

A significant increase is now in evidence for cancer of the stomach and liver, whereas, between 1911 and 1922, only a very slight and in no way significant rise was observed.

Between 1911 and 1922 the upward trend of the deathrate of cancer of the breast among white women was confined to the age group 55 to 64 years; it is now found that the mortality is also increasing in the age range 45 to 54 years.

An analysis of the data by individual organs or parts of the body affected shows, as before, that the most pronounced upward tendency has been registered for cancers of the intestinal tract; but the rise is greater as the period studied is lengthened.

The later investigation, like the former, shows no evidence of a significant decline in the deathrate for cancer of any organ or part of the body.

The above constitute a few of the more important findings of this latest Metropolitan investigation.

LIFE WASTAGE AMONG SCHOOL CHILDREN

The call by President HOOVER for a White House conference on the care and protection of children has focused attention on the subject of child welfare and will give added impetus to the child health movement in America. The seriousness and importance of this problem may be gauged by the gruesome figure of over one-quarter million deaths of children below the age of 15 in a single year, a loss five times that suffered by the American Army in action in the World War. If only children of school age are considered, the annual toll is found to exceed 45,000 lives.

TABLE 1

Number of Deaths in the United States Among Children Ages 5 to 15 Years. 1926

CAUSE OF DEATH	NO. OF DEATHS	PER CENT. OF TOTAL
ALL CAUSES	45,412	100.0
Accidents	9,734	21.4
Influenza and pneumonia	5,412	11.9
Diseases of heart	3,476	7.7
Tuberculosis—All forms	3,421	7.5
Diphtheria	2,936	6.5
Appendicitis	2,913	6.4
Typhoid fever	1,305	2.9
Measles	1,266	2.8
Scarlet fever	1,094	2.4
Diseases of pharynx and tonsils	943	2.1
All other causes	12,912	28.4

Accidents, without a doubt, are the chief cause of mortality of children between the ages of 5 and 15 years; one out of every five deaths occurring in these ages is due to an accident. Accidental deaths exceed the combined number from diphtheria, measles, scarlet fever, typhoid and appendicitis; each of which is a major cause of mortality among school children. First consideration in a program of child protection must, therefore, be given to the prevention of accidental deaths. Influenza and pneumonia combined rank second and head the list of diseases that cause the deaths of school children. Heart disease ranks third, and tuberculosis fourth. These facts are shown clearly in Table 1 on page 5.

The mortality rates from these several causes are not alike for boys and girls. Accidents are the first cause of mortality among both boys and girls, but the boys' deathrate from accidents is nearly two and one-half times that for girls. Were it not for the large excess of fatal accidents among boys, the deathrate for all causes combined would be about on a parity for the sexes at the school ages. For certain types of accidents, the contrast is even more marked. For example, six boys to every one girl die by drowning. Firearms kill 5 boys to every 1 girl. For falls, the ratio is 3 males to 1 female, and for automobile accidents, the ratio is 2½ to 1. Accidental burns, on the contrary, cause more deaths among females, the ratio being 2¼ females to 1 male. Influenza and pneumonia rank second as a cause of death among both boys and girls, but the male deathrate for this disease is higher by some 13 per cent. than that for females. Heart disease is in third place on the boys' mortality list, with a rate of 14.3 per 100,000, but on the girls' list it is fourth, although the rate, 16.0, is above that for boys. Among girls, tuberculosis is the third leading cause, with a deathrate of 16.4 per 100,000 population. The remaining diseases, regardless of their relative importance, show higher rates for females in every case. In other words, the boys experience higher mortality from accidents (burns excepted) and the girls have higher mortality from disease (influenza-pneumonia and, appendicitis excepted). The above data are presented in Table 2 on page 7.

It is apparent that the most important step toward the protection of school children would be to reduce the number of preventable accidents. Toward this end, the energies of all civic organizations, local and national, should be directed. Great responsibility rests with the school authorities who can best weld the activities of

parents, of safety workers, and all others interested in this serious situation.

TABLE 2

Deathrates, 1926, by Cause and Sex, Ages 5 to 15 Years
Registration States of 1920

CAUSE OF DEATH	NUMBER OF DEATHS		DEATHRATES PER 100,000	
	Boys	Girls	Boys	Girls
ALL CAUSES	20,332	16,447	211.5	174.3
Typhoid fever	468	550	4.9	5.8
Measles	514	531	5.3	5.6
Scarlet fever	434	442	4.5	4.7
Diphtheria	1,179	1,238	12.3	13.1
Influenza and pneumonia	2,320	2,018	24.1	21.4
Tuberculosis—All forms	1,245	1,550	13.0	16.4
Diseases of the heart	1,371	1,513	14.3	16.0
Diseases of the pharynx and tonsils	353	411	3.7	4.4
Appendicitis	1,297	1,060	13.5	11.2
Accidents—Total	5,582	2,314	58.1	24.5
Accidental burns	268	581	2.8	6.2
Accidental drowning	1,099	184	11.4	1.9
Traumatism by firearms	412	74	4.3	.8
Traumatism by fall	369	113	3.8	1.2
Automobile accidents	2,146	863	22.3	9.1
Other accidents	1,288	499	13.4	5.3
All other causes	5,569	4,820	57.9	51.1

THE PARIS CONFERENCE TO REVISE THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATH

The Conference for the Revision of the International Classification of Causes of Death will meet in Paris, October 16th. This will be the fourth of these Conferences, the prior ones having been held in 1900, 1909 and 1920.

Practically every nation of the civilized world will be represented, and the United States will send a delegation of nine of its foremost workers in the field of vital statistics. The International Classification is used by registrars the world over as a basis for the presentation, in statistical reports, of the deaths due to the various causes. It is important that each country classify these causes according to a uniform method, in order that the statistics of one nation may be comparable with those of another. The classification, neverthe-

less, must be kept consistent with newly established facts of medicine and pathology, and this calls for its revision every ten years. It is earnestly hoped that the American Delegation will be successful in having adopted, among other things, certain changes in the classification of fatal accidents. Such changes are sorely needed in order that the modern safety movement may have more information on the circumstances surrounding these fatalities. The present classification makes no provision for bringing out in the mortality statistics the chief sources of accidental deaths.

Probably no single country has been as active as the United States in preparing for the forthcoming meeting. Since the first International Conference was held, in 1900, this country has developed so great an interest in vital statistics that it ranks among the foremost nations in this important branch of statistical science. In 1900, only ten of our states and the District of Columbia had, and enforced, workable laws, for the registration and tabulation of the causes of death. At the present time all the states and the District have competent vital statistics bureaus and all but three are associated with the Federal Government in the Registration Area for Deaths. It is confidently expected that by 1930 it will be possible, for the first time, to prepare mortality statistics for the American people as a whole nation.

HEALTH RECORD FOR AUGUST, 1929

The deathrate for August among approximately 19,000,000 Industrial policyholders of the Metropolitan Life Insurance Company was only 7.5 per 1,000. This, with two exceptions (August, 1924 and September, 1922), is the lowest mortality rate ever recorded for any single month among this large cross section of the American and Canadian populations. The year-to-date deathrate for the January-August period was 9.7 per 1,000, as against 9.5 for the like period of 1928. Earlier in the year, 1929 had a high mortality rate due to the large number of deaths during the influenza outbreak last winter, but health conditions are improving with every month, and unless there are very unfavorable developments during the final third of the year, 1929 will rank better than average as a health year.

The cumulative deathrate at the end of August, in the states west of the Rocky Mountains, was 6.9 per 1,000, as compared with 6.8 for the same period of 1929; for the remainder of the United States, the corresponding figures were 9.9 and 9.8. Among the Canadian policyholders the comparison is not so favorable, as the

1929 cumulative deathrate was 9.3 per 1,000, at the end of August, as compared with 9.0 last year.

Comparison with August, 1928, shows improvement this year in the mortality rates for typhoid fever, measles, diphtheria, influenza, tuberculosis, cancer, diabetes (the three principal "degenerative" diseases), pneumonia, diarrheal diseases, puerperal conditions, suicides, homicides and accidents. Even automobile fatalities in August recorded a slightly lower deathrate than obtained a year ago. Improvement was also observed over the deathrates for July, 1929, for nearly all of the causes of death listed on page 11.

Health conditions during the January-August period may be summed up as follows: There has been no general epidemic prevalence of any disease, with the exception of the influenza outbreak of last winter. Diseases of major public health interest, like typhoid fever, measles, scarlet fever, diphtheria, tuberculosis, pneumonia, diarrheal diseases and puerperal conditions, have recorded more or less lower mortality rates than in 1928. Four of the most important of these—tuberculosis, diphtheria, diarrheal complaints and puerperal diseases—give excellent promise of registering lower mortality rates this year than ever before.

The general deathrate for the large cities of the United States in August was 10.6 per 1,000 population. This was slightly below the rate for the previous month (10.7) and also lower than the figure for August, 1928 (11.0). Comparison with July, 1929, shows that influenza, poliomyelitis and typhoid fever were more prevalent but that there were fewer cases of scarlet fever, smallpox, diphtheria and measles. As compared with August, 1928, there was greater prevalence this year of scarlet fever, smallpox and measles, but fewer cases of typhoid fever, diphtheria, influenza and poliomyelitis. These statements are based on the number of cases reported during the first four weeks of each of these months.

Reports from twenty-nine states show 2,347 cases of diphtheria in August, as compared with 2,488 in July. Alabama and South Carolina were the only states to show increases. Measles cases, in seventeen states, numbered only 1,997 as compared with 7,582 in July, with the most noteworthy declines in Ohio and Wisconsin. This disease (like scarlet fever, which also showed a marked decrease during August) is less prevalent in the late summer and early fall than at other seasons.

Typhoid fever cases, in forty states, increased from 2,206, in July to 2,683 in August. Typhoid morbidity invariably rises in

August, and the increase this year has been smaller than usual. Illinois, Iowa, Texas and New Mexico recorded the most noteworthy rises. Up to September 7th, according to press reports, fifty-one typhoid cases in New York City, and a number in other states, had been traced to an outbreak in a Pennsylvania summer camp.

There was a considerable increase in case reports of poliomyelitis. These numbered, in forty-one states, 112 in July and 184 in August. The increase in Ohio was from five to fourteen cases and in Michigan, from three to thirty.

Some of the more important health activities of the month are the following: The Commissioner of Health of New York City held a conference with the presidents of the five county medical societies to lay before them a plan for the physical examination of 50,000 children entering school for the first time in September. It was planned to send to each parent who registers a child a letter urging that the child be taken to the family physician for an examination before going to school. In the event that parents are unable to pay for this service, it is proposed to have physicians of the Health Department make the examinations in the schools. The State Department of Health of Iowa announced that a Division of Preventable Diseases had been established.

The following table shows the mortality among the Industrial policyholders for August, 1929; July, 1929 and August, 1928, together with the cumulative rate for the first eight months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-paying Business in Industrial Department (Annual Basis)

MONTHS OF AUGUST, 1929; JULY, 1929, AND OF AUGUST, 1928

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*				
	August, 1929	July, 1929	August, 1928	Cumulative January to August	
				1929	1928
TOTAL—ALL CAUSES	752.8	822.0	851.2	966.3	951.4
Typhoid fever	3.2	3.2	4.4	2.0	2.3
Measles	1.6	2.7	2.2	3.9	7.3
Scarlet fever	1.1	2.4	1.0	3.0	3.2
Whooping cough	6.3	5.8	5.5	6.2	6.1
Diphtheria	4.0	6.5	4.5	8.4	10.0
Influenza	3.8	5.2	5.6	54.6	26.4
Tuberculosis (All forms)	77.1	86.9	91.8	90.1	95.3
Tuberculosis of resp'y system	68.7	75.8	79.9	79.8	83.4
Cancer	71.2	78.5	75.5	75.9	75.4
Diabetes mellitus	14.1	15.4	15.7	19.1	18.2
Cerebral hemorrhage	45.5	53.1	52.3	58.0	58.2
Organic diseases of heart	114.7	123.4	125.0	151.4	147.0
Pneumonia (All forms)	33.7	39.3	38.2	101.3	102.3
Other respiratory diseases	9.0	8.4	11.8	12.8	14.2
Diarrhea and enteritis	30.9	20.4	41.3	17.0	20.8
Bright's disease (Chronic nephritis)	58.7	62.4	61.4	70.5	72.4
Puerperal state	11.4	14.4	14.6	13.8	14.4
Suicides	6.9	7.9	8.4	8.4	8.4
Homicides	6.4	6.1	6.7	6.2	6.4
Other external causes (excluding suicides and homicides)	70.2	79.0	82.6	62.6	62.3
Traumatism by automobiles	22.1	22.6	23.0	18.2	16.5
All other causes	183.0	201.2	202.7	201.0	200.7

*All figures include infants insured under one year of age.

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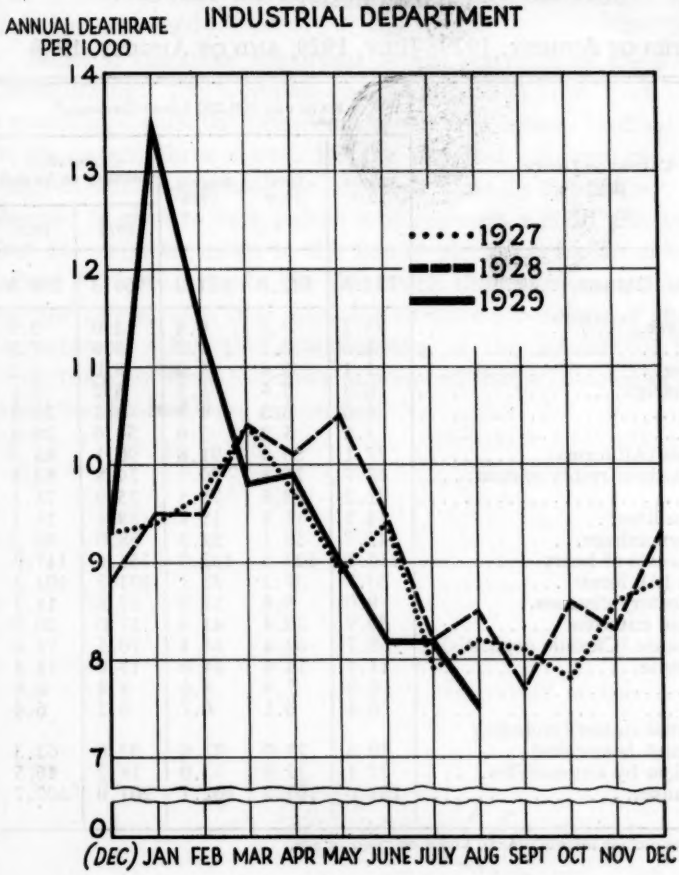
DEATHRATES
FROM ALL CAUSES

METROPOLITAN LIFE INSURANCE CO.
INDUSTRIAL DEPARTMENT



1927	9.4	9.7	10.4	9.7	8.9	9.4	7.9	8.2	8.1	7.8	8.6	8.8
1928*	9.5	9.5	10.4	10.1	10.5	9.5	8.2	8.5	7.7	8.6	8.3	9.3
1929	13.4	11.4	9.8	9.9	9.0	8.2	8.2	7.5				

* Rates for 1928 are final

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